

**What is claimed is:**

1. A motor controller including a position sensing device having a position sensor for sensing a magnetic pole of a motor, a driver for driving the motor, and a wiring section for feeding a power supply voltage from the driver  
5 into the position sensing device, wherein  
the position sensing device comprises:  
a superposed wave transmitter coupled to a first end of the wiring section;  
a serial converter for converting a signal of the position sensor into a serial signal; and  
10 a sensing-device interface disposed between the serial converter and the superposed wave transmitter,  
the driver comprises:  
a dc power supply;  
a superposed wave receiver coupled between the dc power supply and a  
15 second end of the wiring section;  
a parallel converter for converting the serial signal into a parallel signal;  
a driver interface disposed between the superposed wave receiver and the parallel converter; and  
a power switching circuit to be driven by the parallel signal,  
20 wherein the serial signal is superposed to the wiring section and transmitted, and the power switching circuit switches a phase excitation for driving the motor.
2. The motor controller of claim 1, wherein  
25 the superposed wave transmitter includes a sensing-device transformer, which has a power supply wire-wound section coupled to the first end of the wiring section and a signal wire-wound section coupled to the sensing-device

interface; and

the superposed wave receiver includes a driver transformer, which has a power supply wire-wound section coupled to the second end of the wiring section and a signal wire-wound section coupled to the driver interface.

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3. The motor controller of claim 2, wherein the sensing-device interface has a transmitting circuit, and the driver interface has a receiving circuit, and the serial signal is transmitted from the sensing device to the driver in one way.

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4. The motor controller of claim 2,

wherein the sensing-device interface and the driver interface have respectively a transceiver,

wherein the serial signal is transmitted from the sensing device to the driver, and a control signal for adjusting synchronization of communication is transmitted from the driver to the position sensing device.

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5. The motor controller of claim 2, wherein the position sensing device further includes an A/D converter, and the signal of the position sensor is converted into a digital signal, then fed into the serial converter.

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6. The motor controller of claim 5, wherein the position sensor is formed of three or two Hall elements, which are arranged at intervals of 120 degrees.

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7. The motor controller of claim 5, wherein the position sensor is formed of two Hall elements, which are arranged at an interval of 90 degrees.

8. The motor controller of claim 2, wherein the position sensing device further includes a power incoming section, wherein the power supply wire-wound section of the sensing-device transformer is inserted between a positive side and a negative side in series between the wiring section and the power incoming section, wherein the power incoming section forms a power supply of the position sensing device.

9. The motor controller of claim 2, wherein the power supply wire-wound section of the driver transformer is inserted between a positive side and a negative side in series of the dc power supply.

10. The motor controller of claim 8, wherein the position sensing device further includes a capacitor coupled to the power incoming section in parallel.

11. The motor controller of claim 2, wherein the driver further includes a capacitor coupled to the dc power supply in parallel.

12. The motor controller of claim 2, wherein the driver further includes a resistor having a resisting value similar to a characteristic impedance of the wiring section, and the resistor is coupled to the wiring section in parallel.

13. The motor controller of claim 12, wherein the driver further includes a capacitor coupled to the resistor in series.

14. The motor controller of claim 2, wherein the wiring section comprises one of twisted two cables and a pair of shielded twisted cables.

15. The motor controller of claim 1,

wherein the superposed-wave transmitter is equipped with a choke coil disposed on the sensing device side, coupled to a first end of the wiring section, and a coupling capacitor disposed on the sensing device side and coupled  
5 between the first end of the wiring section and the sensing-device interface, and

wherein the superposed-wave receiver is equipped with a choke coil disposed on the driver side, coupled between the dc power supply and a second end of the wiring section, and a coupling capacitor disposed on the driver side and coupled between the second end of the wiring section and the driver  
10 interface.

16. The motor controller of claim 15, wherein the sensing-device interface has a transmitting circuit, the driver interface has a receiving circuit, and the serial signal is transmitted from the sensing device to the driver in one  
15 direction.

17. The motor controller of claim 15,

wherein the sensing-device interface and the driver interface have respectively a transceiver,  
20 wherein the serial signal is transmitted from the sensing device to the driver, and a control signal for adjusting synchronization of communication is transmitted from the driver to the position sensing device.

18. The motor controller of claim 15, wherein the position sensing  
25 device further includes an A/D converter, and the signal of the position sensor is converted into a digital signal, then fed into the serial converter.

19. The motor controller of claim 18, wherein the position sensor is formed of three or two Hall elements, which are arranged at intervals of 120 degrees.

5        20. The motor controller of claim 18, wherein the position sensor is formed of two Hall elements, which are arranged at an interval of 90 degrees.

21. The motor controller of claim 15, wherein the position sensing device further includes a power incoming section, wherein the choke coil  
10 disposed on the position sensing device side is inserted between a positive side and a negative side in series between the wiring section and the power incoming section, wherein the power incoming section forms a power supply of the position sensing device.

15        22. The motor controller of claim 15, wherein the choke coil disposed on the driver side is inserted between a positive side and a negative side in series of the dc power supply.

23. The motor controller of claim 21, wherein the position sensing  
20 device further includes a capacitor coupled to the power incoming section in parallel.

24. The motor controller of claim 15, wherein the driver further includes a capacitor coupled to the dc power supply in parallel.

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25. The motor controller of claim 15, wherein the driver further includes a resistor having a resisting value similar to a characteristic impedance

of the wiring section, and the resistor is coupled to the wiring section in parallel.

26. The motor controller of claim 25, wherein the driver further includes a capacitor coupled to the resistor in series.

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27. The motor controller of claim 15, wherein the wiring section comprises one of twisted two cables and a pair of shielded twisted cables.

28. The motor controller of claim 1,

10 wherein the superposed-wave transmitter is equipped with a choke coil disposed on the sensing device side, coupled to a first end of the wiring section, and a coupling capacitor disposed on the sensing device side and coupled between the first end of the wiring section and the sensing-device interface, and

15 wherein the superposed-wave receiver includes a driver transformer, and the transformer is equipped with a power supply wire-wound section coupled to a second end of the wiring section and a signal wire-wound section coupled to the driver interface.

20 29. The motor controller of claim 28, wherein the interface included in the sensing device has a transmitting circuit, the driver interface has a receiving circuit, and the serial signal is transmitted from the sensing device to the driver in one direction.

30. The motor controller of claim 28,

25 wherein the sensing-device interface and the driver interface have respectively a transceiver,

wherein the serial signal is transmitted from the sensing device to the

driver, and a control signal for adjusting synchronization of communication is transmitted from the driver to the position sensing device.

31. The motor controller of claim 28, wherein the position sensing  
5 device further includes an A/D converter, and the signal of the position sensor is converted into a digital signal, then fed into the serial converter.

32. The motor controller of claim 31, wherein the position sensor is  
formed of three or two Hall elements, which are arranged at intervals of 120  
10 degrees.

33. The motor controller of claim 31, wherein the position sensor is  
formed of two Hall elements, which are arranged at an interval of 90 degrees.

34. The motor controller of claim 28, wherein the position sensing  
15 device further includes a power incoming section, wherein the choke coil disposed on the position sensing device side is inserted between a positive side and a negative side in series between the wiring section and the power incoming section, wherein the power incoming section forms a power supply of the  
20 position sensing device.

35. The motor controller of claim 28, wherein the power supply  
wire-wound section of the driver transformer is inserted between a positive side and a negative side in series of the dc power supply.  
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36. The motor controller of claim 34, wherein the position sensing  
device further includes a capacitor coupled to the power incoming section in

parallel.

37. The motor controller of claim 28, wherein the driver further includes a capacitor coupled to the dc power supply in parallel.

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38. The motor controller of claim 28, wherein the driver further includes a resistor having a resisting value similar to a characteristic impedance of the wiring section, and the resistor is coupled to the wiring section in parallel.

10 39. The motor controller of claim 38, wherein the driver further includes a capacitor coupled to the resistor in series.

40. The motor controller of claim 28, wherein the wiring section comprises one of twisted two cables and a pair of shielded twisted cables.

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41. The motor controller of claim 1,  
wherein the superposed-wave transmitter includes a sensing-device transformer, which is equipped with a power supply wire-wound section coupled to a first end of the wiring section, and a signal wire-wound section coupled to  
20 the sensing device interface, and

wherein the superposed-wave receiver is equipped with a choke coil disposed on the driver side, coupled between the dc power supply and a second end of the wiring section, and a coupling capacitor disposed on the driver side and coupled between the second end of the wiring section and the driver  
25 interface.

42. The motor controller of claim 41, wherein the sensing-device



interface has a transmitting circuit, the driver interface has a receiving circuit, and the serial signal is transmitted from the sensing device to the driver in one direction.

5           43. The motor controller of claim 41,  
              wherein the sensing-device interface and the driver interface have  
              respectively a transceiver,

              wherein the serial signal is transmitted from the sensing device to the  
              driver, and a control signal for adjusting synchronization of communication is  
10           transmitted from the driver to the position sensing device.

              44. The motor controller of claim 41, wherein the position sensing  
              device further includes an A/D converter, and the signal of the position sensor is  
              converted into a digital signal, then fed into the serial converter.

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              45. The motor driver of claim 44, wherein the position sensor is formed  
              of three or two Hall elements, which are arranged at intervals of 120 degrees.

              46. The motor driver of claim 44, wherein the position sensor is formed  
20           of two Hall elements, which are arranged at an interval of 90 degrees.

              47. The motor controller of claim 41, wherein the position sensing  
              device further includes a power incoming section, wherein the power supply  
              wire-wound section of the sensing-device transformer is inserted between a  
25           positive side and a negative side in series between the wiring section and the  
              power incoming section, wherein the power incoming section forms a power  
              supply of the position sensing device.

48. The motor controller of claim 41, wherein the choke coil disposed on the driver side is inserted between a positive side and a negative side in series of the dc power supply.

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49. The motor controller of claim 47, wherein the position sensing device further includes a capacitor coupled to the power incoming section in parallel.

10 50. The motor controller of claim 41, wherein the driver further includes a capacitor coupled to the dc power supply in parallel.

51. The motor controller of claim 41, wherein the driver further includes a resistor having a resisting value similar to a characteristic impedance  
15 of the wiring section, and the resistor is coupled to the wiring section in parallel.

52. The motor controller of claim 51, wherein the driver further includes a capacitor coupled to the resistor in series.

20 53. The motor controller of claim 41, wherein the wiring section comprises one of twisted two cables and a pair of shielded twisted cables.